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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,882	10/21/2003	Hideki Yamada	10089/22	2771

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EXAMINER

DRODGE, JOSEPH W

ART UNIT	PAPER NUMBER
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1723

DATE MAILED: 11/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/688,882

Applicant(s)

YAMADA ET AL.

Examiner

Joseph W. Drodge

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumano et al patent 5,783,079 in view of Marino et al patent 4,638,168, Taketani et al patent 4,260,652 and admissions of the Instant Specification on pages 13 and 14.

Kumano et al disclose a process of producing a polysulfone porous hollow fiber by a

dry-set? (dry-wet) formation (column 6, lines 29-32 and 45-48), forming a thin separating layer by interfacial condensation including contacting the fiber membrane with solutions of amine and acid halide, respectively where the concentrations of the two solutions may vary but are held substantially constant by renewing the respective bath sources when necessary (column 7, lines 44-49 and column 8, lines 31-52 and column 12, lines 24-41).

The thickness of the separating layer is said to be optimized with respect to being thick enough to avoid defects while not being so thick as to deteriorate permability and to be a function of concentrations of the solutions and may vary widely depending upon selected concentrations (column 8, lines 31-52 and column 10, lines 31-46).

The claims differ in requiring the membranes to have a property such that, in the infrared absorption spectrum, the ratio of adsorption intensity of the polyamide layer to the polysulfone layer, at a specified absorption peak and wavenumber ranges between 0.1 and 1.5, have a sucrose removal of 95.2% or more, and have a water permeability of 0.2 m³/m²/day with respect to an aqueous sucrose solution at particular operating pressure, temperature and pH.

As to adsorption intensity ratios, the instant specification at pages 13-14 teach that such ratios inherently vary primarily as a result of thicknesses of the respective membrane layers, while Marino et al teach determination of hollow fiber, polyamide or polysulfone material, thicknesses by measured adsorption intensities in any wavelength of light, including infrared (column 2, lines 53-65) and Taketani et al teach to determine thicknesses of both a separating polyamine layer and substrate polysulfone layer of

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composite membranes with controlled layer thicknesses (column 25, lines 26-33 and column 28, lines 50-57, etc.) and in which the polymer concentrations and chemical makeup may be measured by infrared adsorption spectroscopy (column 29, lines 12-68).

It would have been obvious to one of ordinary skill in the art to have considered the Kumano et al membrane to inherently possess the claimed absorption intensity ratio, since Kumano et al teach to optimize membrane layer composition concentrations and thicknesses, the instant Specification teaches that layer thicknesses are the primary factor in giving adsorption intensity ratio values, and Marino et al and Taketani et al teach that membrane thicknesses and compositions are readily determinable by infrared adsorption spectrum analysis.

With respect to sucrose removal and attendant water permeability, Kumano et al disclose the membrane being used for separating dextrose or glucose from an aqueous solution and effectively removing dextrose while maintaining a high water permeability (Example 1 coupled with Table 1 on column 21). Also, at column 17, lines 2-3, see removal of approximately 95% of dextran or glucose from a solution being filtered. Additionally, at column 5, lines 57-66, etc. Kumano discloses varying of porosity, hence molecular weight cut-off of the membrane depending upon what is being filtered. Thus, it would have been also obvious to one of ordinary skill in the art to have optimized the membrane of Kumano et al to be operative to remove the claimed percentage of sucrose from aqueous solution, since sucrose is chemically similar to dextrose/glucose and sucrose removal or concentration by membrane separation would inherently be of

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importance in the same industrial environments as dextran/glucose removal concentration; and also, Kumano et al teach that separating layer concentrations and thicknesses can be widely varied for optimization.

With regard to claim 18, column 9, lines 1-7 of Kumano indicate sequential contact with the amine solution and acid halide solution.

With regard to claim 19, Kumano discloses trifunctional acid halide at column 8, line 14.

With regard to claim 20, Kumano teaches piperazine compounds at column 8, lines 3-7.

With regard to claim 21, column 8, lines 36-40 of Kumano disclose approximately equal concentrations of piperazine type multifunctional halide and acid halide hence a ratio within the specified range.

Applicant's arguments filed on 9/22/2005 have been fully considered but they are not persuasive. It is argued that the references do not teach maintaining a constant concentration of amine solution during production of the membrane. However, Kumano clearly discloses concern with establishing and maintaining optimum concentration of solutions and of replenishing baths to control concentrations for such maintaining at column 12, lines 25-28 and lines 39-41 in particular.

It is also argued that Kumano does not demonstrate obtaining a membrane with high sucrose removal. It is submitted that removal of dextran, i.e. glucose, is given as only an example of the membrane's capabilities (column 6, lines 16-18) and that the Kumano membrane may be employed for a wide variety of end uses depending upon

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selected pore sizes and shapes (column 1, lines 18-21 "...removal of valuable matter in aqueous solutions..." and column 5, lines 56-65 concerning pore sizes and shapes.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Drodge at telephone number 571-272-1140. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda Walker, can be reached at 571-272-1151. The fax phone number for the examining group where this application is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either private PAIR or Public PAIR, and through Private PAIR only for unpublished applications. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have any questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JWD

October 31, 2005


JOSEPH DRODGE
PRIMARY EXAMINER